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Washington, D.C. 20554

In the Matter of	)	
Advanced Television Systems	)	
and Their Impact Upon the	)	MM Docket No. 87-268
Existing Television Broadcast	)	
Service	)	

COMMENTS OF
DAVID H. STAELIN

These comments are directed to Paragraph 47: Compatibility With Other Media. They are submitted in my capacity as a private citizen and as a technologist who participated in the Committee on Open High Resolution Systems (COHRS) activities cited in the Notice of Proposed Rule Making, and in subsequent related standards activities. These comments support the view that the qualities of interoperability and extensibility are important to the ultimate success of any over-the-air ATV broadcast system.

A viable over-the-air advanced television (ATV) system will necessarily utilize a substantial and valuable portion of the electromagnetic spectrum. The properties of interoperability, extensibility, scalability, and harmony with other standards, as advocated by the COHRS, will maximize the economic and societal value of this spectrum for both broadcasters and the public. The competitiveness and economic viability of an ATV system will depend in part on its ability to offer continually improved and varied services in competition with services offered via other media, some of which are beyond the regulatory scope of the FCC. To unnecessarily restrict this potential for future service and performance growth would be a tragedy for the over-the-air ATV industry. These issues arise now for the first time because of the enormous flexibility in

service provided by digital signals. An ATV system must be digital in order to remain competitive and economically viable over the next few decades. Finally, there is every reason to believe that the qualities advocated by COHRS can be achieved with digital systems at little or no additional cost to initial consumers, and with subsequent benefits as technology and service enhancements by broadcasters develop.

The importance of the properties advocated by COHRS is not restricted to the broadcaster-consumer link; it is also vital to the economic generation and editing of delivered audio and video programming. Increasingly such generation and editing is facilitated or even entirely executed by computers and related digital equipment. This industry is growing at a rapid rate. Easy compatibility with these developments will be essential to economical broadcasting in the future. As explained below, it will also have a significant impact on the quality of the product offered to consumers.

Existing broadcast systems are analog in character, and therefore intrinsically less flexible if economic mass-produced receivers are employed. Yet most U.S.-proposed ATV systems are digital, enormously reducing the economic barrier to extensibility and interoperability. A few simple examples indicate the potential value to both broadcaster and consumer of these properties. Suppose, after a few years, some ATV broadcasters wish to provide dual-language soundtracks or closed captions. This capability could be provided by adding to the data stream additional data conveying the second language. If an over-the-air broadcasting standard were interoperable and extensible, then receiving equipment produced earlier could successfully ignore the second language. In the absence of such a standard, it is unlikely a previously produced receiver could accommodate such a new signal, and therefore such a new service could not be introduced without obsoleting much equipment -- an unacceptable situation.

In the future it should be possible to design equipment which could even properly interpret additional signals and services not defined at the time it was manufactured. Computers routinely do this now as new software is introduced. Although it is unlikely initial ATV receivers would have this flexibility, nonetheless proper selection of a transmission standard could make this possibility more feasible in the future, thus enlarging the range of services broadcasters could provide to their listeners. One simple and inexpensive way to achieve such flexibility is to employ a broadcast standard which labels each block of data with a unique identification code which the receiver could easily recognize and use to determine how that block should be handled. New types of data would go unrecognized and, if the standard incorporated the length of each such data block, the receiver could easily skip over it. Such processing is trivial in modern digital equipment. Many such innovative services could be added, such as sign language inserts for the deaf, multi-channel sound, simple

zoom and pan instructions for viewers desiring a close-up video option, and many others.

A second possible benefit of a transmission standard supporting extensibility and interoperability is a variety of optional auxiliary information that permits more advanced receivers to yield superior video or audio quality. For example, initial ATV receivers may have a single fixed-frame display rate. Although broadcast ATV signals would accommodate this display rate, future receivers may be able to provide superior video quality at higher frame rates if additional information about the original source frame rate were available. For example, twenty-four frame-per-second movies are often broadcast at ~60 fps using 3-2 pull-down techniques; an advanced receiver, knowing this, might display the same signals at seventy-two frames per second without the artifacts associated with the traditional NTSC approach. Similar improvements could be obtained for other source frame rates and pixel sampling patterns.

Similarly, a variety of color cameras and films are currently used to generate high-resolution imagery, and this variety can be expected to expand. Superior rendition by advanced receivers of the future could be achieved if the broadcaster could convey the nature of the color camera and film employed. The variety of ways the broadcaster could improve the quality of his product for customers purchasing superior receivers is limited principally by the imagination of the industry and future technology advances. Again, one of the principal properties of an extensible and interoperable transmission standard is that it would, at the outset, define means by which initial receivers would know how to ignore future improvements without impairing service quality. By protecting such early receivers from premature obsolescence as services expand, the barriers to such service expansion will be removed and the value of the spectrum maximized. This is particularly important in an environment where over-the-air transmission will be increasingly competing with alternative modes of program delivery, these alternative modes employing standards to be defined in the future. Such standards will almost certainly become increasingly flexible as time passes.

The flexibility offered by an extensible and interoperable transmission standard will also permit transmission of information identifying authorship, ownership, restrictions on use, royalty payment information, and other information in forms that could evolve over the years. Again, it is not necessary for early ATV receivers to be able to interpret such information, rather it is important that they be able to ignore it. In this way receivers could be improved in parallel with broadcasting services to advance the industry.

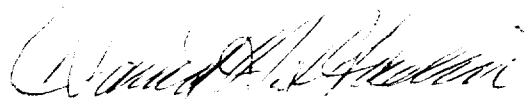
Finally, it is likely that definition of an efficient approach to extensibility and interoperability could motivate vendors of studio and other production and transmission equipment to employ the same protocols, permitting lower cost

and higher quality program production. In the same way that such transmission standards could prevent premature obsolescence of receivers, they also could prevent premature obsolescence of such studio equipment as new improvements are introduced. Such improvements would merely be transparent to earlier generations of equipment.

Standards development efforts now under way are making it clear that such transmission standards can be defined with the properties advocated above. They would trivially impact the complexity of even early low-cost ATV consumer receivers, let alone studio equipment, and would make negligible inroads on the data transmission capability of the radio spectrum, or on the capacity of video recording equipment. Details of potential standards exhibiting these properties may become available before the termination of this proceeding and are to be described in a SMPTE Task Force report due 1 January 1992.

In summary, the properties of extensibility and interoperability will be very important to the successful development of over-the-air ATV systems. The adoption of rules for such a service without these properties could jeopardize the long-term competitiveness of this service with respect to alternative means of carriage, and could reduce the incentives of broadcasters to provide high-quality service into the future. The alternative of adopting a rigid inflexible transmission standard, and then changing it periodically to incorporate improved technology would be uneconomic if each such change rendered the installed base of ATV receivers and broadcasting equipment obsolete. On the other hand, an extensible and interoperable ATV system, in combination with the high-quality performance expected from one or more of the present groups developing digital ATV systems, would sharply advance the United States in the quality, efficiency, and potential for further improvement of its broadcasting services, and therefore in the economic value of that spectrum.

Respectfully submitted,



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